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ABSTRACT

Television is of limited value to hearing-impaired children, who cannot benefit from the soundtrack. Traditional caption writing techniques, which involve editing of the audio track, have been based primarily on the captioner's empirical knowledge and intuition and aim the captions at a presumed average language and reading ability of the target audience. These methods are inadequate to meet the needs of hearing-impaired students effectively, most of whom have delayed reading skills and deviant decoding strategies. In response to the need for a more effective, theoretically based, easily replicable system of caption writing for children, the Multilevel Linguistic Captioning Project at The Caption Center, WGBH-TV, Boston, has developed a linguistically based method of caption writing. This project has standardized procedures by analyzing three primary elements of language: syntax, semantics and inference. This process of language analysis has been organized into a hierarchical order at three levels of complexity. Twenty-one captioned children's television programs have been developed and are available for rental, along with an instructional manual. (AMH)

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NEW DEVELOPMENTS IN CAPTIONED TELEVISION
FOR HEARING-IMPAIRED CHILDREN

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Multi-level Captioning Project
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Captioning for hearing-impaired children

Television is a major source of information and entertainment for hearing children. However, hearing-impaired youngsters, who cannot understand the soundtrack, have always viewed TV with inadequate comprehension and frustration. During the 1970's, captioning has been utilized increasingly as a tool to aid the hearing impaired. Captions take the place of the soundtrack by translating the dialogue and narration into written words. Writing captions for children requires that the original audio track be condensed and rewritten in order to adjust the language to a level that matches their reading ability.

Reading problems of deaf children

It is a well-documented fact that deaf children acquire reading skills at a significantly slower rate than do hearing children. Furthermore, most deaf children never catch up. The trend seems to be that, after the age of 8, they fall further and further behind their hearing counterparts. A recent study by the Office of Demographic Studies at Gallaudet College in Washington, D.C., shows that whereas the average hearing 17-year-old is reading beyond a 10th-grade level, the average deaf student of the same age is reading just beyond a 3rd-grade level.¹

The intuitive, single-level approach to captioning

Since maximum comprehension is a primary goal of captioning, it is

natural that any system for writing captions should be based on a knowledge of reading achievement in the hearing-impaired student population. Yet, no formalized system exists which integrates linguistic and reading research with caption writing. Most captioners have relied primarily on intuition in recognizing complexity of grammatical constructions in an original program script and in generating captions. Furthermore, a single reading/captioning level, traditionally the standard approach in captioning, is not sensitive to the various stages in the language development of deaf students. Programs captioned on a single level -- however controlled the language may be to meet the needs of deaf readers -- will be too simple for the advanced student and too difficult for the beginner.

The multi-level linguistic approach

At The Caption Center, WGBH-TV, Boston, the federally funded Multi-level Captioning Project has researched and developed an alternative to the intuitive, single-level approach to captioning. This improved caption-writing technique provides linguistic guidelines at three distinct levels of linguistic complexity representing a hierarchy of difficulty. Captions at each level are generated by analyzing and controlling for syntax, vocabulary and idiomatic expressions, and inferential, i.e. unstated, information.

Analysis of syntax

The theory of transformational generative grammar provides a

framework for analyzing the syntactic complexity of language.² According to this theory, all sentences in a language are generated by a series of operations which work on the most basic sentence structures. These operations, called transformations, add complexity and variety to utterances, making language an infinitely creative tool of communication. Transformations operate according to specific rules which allow the user to alter the basic sentence pattern by rearranging word order, adding or deleting phrases, and combining simple sentences into more complex syntactic form.

Central to this theory is the concept that all sentences have both a deep structure, which contains the meaning of the sentence, and a surface structure, which is the form of the sentence as it is used in communication. The surface structure generally is made up of one or more transformations of the deep structure.³ Adult language competency implies acquisition of a great number of transformations. Children appear to learn these operations in a regular, predictable order.

Applying transformational generative theory to generating captions at increasing levels of linguistic complexity, the captioner alters the surface structure (the form used in writing) while maintaining the deep structure (the meaning of the sentence). This theory is particularly appropriate for caption generation because it makes it possible to understand how we may systematically vary expression and yet retain meaning. Furthermore, it offers a frame-

work for analyzing the structure of English sentences, making it possible to determine distinct levels of linguistic complexity.

In order to determine the appropriate syntactic structures to be included in each of the captioning levels, the literature on deaf children's acquisition of English structures was consulted. This primarily includes the reported results of the performance of deaf adolescents, age 10-19, on the Test of Syntactic Abilities (TSA).⁴ This test instrument allowed the researchers to describe the order and extent of acquisition of structures and developmental stages within structures. In addition, strategies for interpretation of structures were analyzed.

The results of the TSA showed that the order of acquisition of structures for the deaf subjects was the same order as predicted by transformational generative theory. Additionally, it was noted that the least difficult structures for the deaf (negation, conjunction, question formation) were those requiring fewer transformations from deep to surface structure. More difficult structures (verb system, complementation, relativization) involved a greater number of transformations with departure from the subject-verb-object order.

This information provided a foundation for decisions regarding which structures are incorporated at each captioning level. Those structures which were shown to be too difficult for the

oldest subjects in the study are excluded from use at any of the levels (e.g., passives and certain types of relativization and complementation). In those cases where reported data on structure difficulty for deaf students is unavailable, decisions are based on presumed complexity within the framework of transformational grammar. In these instances, a structure might be included at Level I if it requires one or no transformations or excluded until Levels II or III if two or more transformations are involved. Question formation is presented in the multi-level chart on page 9 as an example of how one structure is handled in detail.

Analysis of semantics

The second variable involved in reading comprehension is vocabulary level. When the normally hearing child starts learning to read, that child already has a well-established vocabulary of approximately 5,000-6,000 words. Every word met in early reading is already known by the normally hearing youngster. In contrast, the hearing-impaired child typically enters school with a drastically limited vocabulary; it is not unusual for a deaf child to have an active vocabulary of under a dozen words. This gap in semantic knowledge between the two populations is rarely closed. Whereas the hearing student learns new words and expressions almost incidentally through constant exposure to sounds, speech and communication, every word mastered by the deaf child must be formally and deliberately taught. Abstract words and idioms are particular problem areas.

Unfortunately, there is little systematic information on the reading vocabulary of the hearing-impaired child. Only one published study has dealt with this area of language ability in a large sample of hearing-impaired children.⁵ Furthermore, there is virtually no research available on the acquisition of idioms to guide captioners in controlling for this aspect of language. Thus, in the caption writing process, lexical decisions are made largely on empirical grounds. Based on the captioner's knowledge and experience of how deaf children learn, each word in the original text is evaluated according to the level of sophistication required in understanding that word's meaning, including its potential ambiguities. In addition, graded vocabulary lists, standardized on hearing populations, are used as references and cross-checked for assigned word level.

Analysis of inference

The area of inference concerns meanings which are implied, but not directly stated, in the literal message. The ability to draw inferences requires integration of information. It is a skill which improves with age. Gibson and Levin emphasize the importance of this aspect of reading.

The ability to use larger units and to make inferences from the text is involved in skilled reading rather than simply the ability to decode, so that skilled decoders who have not learned to organize the text into higher-order groupings may still be poor readers, so far as comprehension is concerned.⁶

Much of the research in the area of inference is fairly new, and few investigations have focused on the ability of hearing-impaired

children to deal with embedded meanings. However, at all ages, they appear to be severely limited in their use of inferential strategies; they tend to interpret written material literally and concretely, with little integration of new information with prior knowledge, or consideration of extra-linguistic cues.

In order for a hearing-impaired child to build an integrated idea of the theme of a television program, captions are written to control for information which is not explicitly stated. The implicit is made explicit whenever possible. Captions clarify unstated thoughts, emotions and visual information, and also restate ironic, hyperbolic and metaphoric language in order to elucidate its underlying meaning.

Distribution of captioned television programs

In developing and applying a linguistically controlled method of caption writing, The Caption Center at WGBH has produced 21 captioned children's television programs on 3/4-inch video-cassettes. Selected episodes from four popular television series, currently broadcast nationally on major networks, are available for rental to schools and programs for the hearing-impaired.

Captioning Reference Manual available

A Captioning Reference Manual has been written by project staff as a guide for captioners, media specialists, educators

and others who prepare written materials for the hearing impaired. This manual sets forth guidelines for controlling vocabulary, syntax and inferential information at three levels of linguistic complexity. It is hoped that replicability of the multi-level method will eventually lead to an increase in the amount of reading materials specifically prepared to meet the reading and language needs of deaf children.

The manual includes an introduction describing the rationale and approach for the multi-level captioning project; separate sections describing and analyzing the three main linguistic components of language in a developmental hierarchy, and an explanation of the non-linguistic parameters affecting caption generation. In addition, an annotated bibliography is provided for those persons who are interested in further study.

To order videocassettes or manual, contact:

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Question Formation Table⁷

	Level I	Level II	Level III
● yes/no questions (with or without do-support)	*	*	*
Is Mary outside? Did Mary go outside?			
● simple WH-questions (WH-word as subject; no do-support)	*	*	*
Who is your teacher? Where are you going?			
● positive WH-questions (with do-support)	--	*	*
What did you do yesterday? Where did you play after school?			
● "What" noun phrase (What kind...?)	--	*	*
What class do you have now? Which book did you bring?			
● negative WH-questions	--	--	*
Why didn't you call?			
● indirect questions	--	--	*
John asked where Mary went.			
● tag questions	--	--	--
You did eat, didn't you?			

* allowed
-- not allowed

FOOTNOTES

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